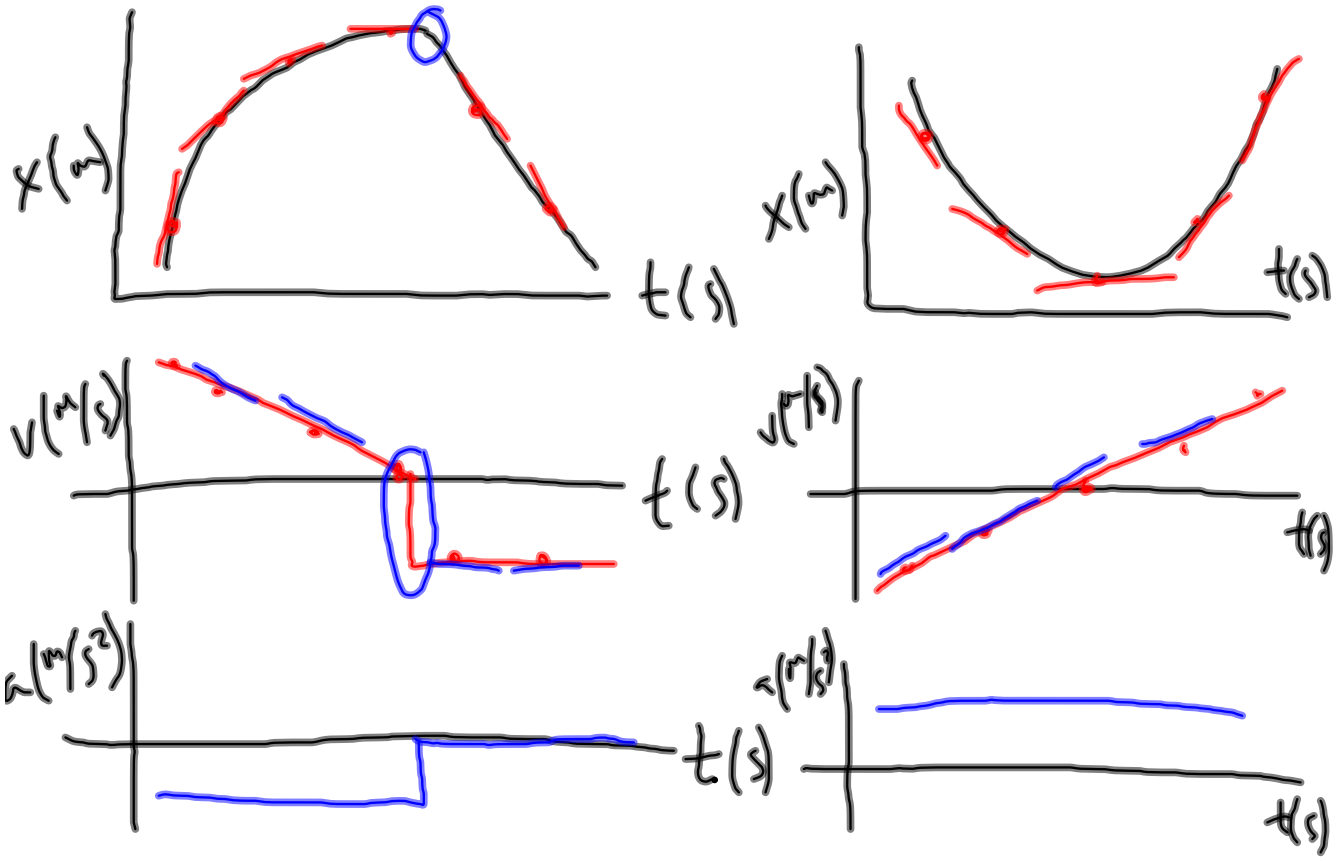
Motion and Kinematics Equations Notes 4th Block 8.24.11



46) How far do the students walk so that the faster student arrives 5.5 minutes before the slower student?

$V_1 = 0.90\ m/s$

$V_2 = 1.90\ m/s$

$\Delta x = ?$

$t_1 - t_2 = 330\ s$

$V_1 = \frac{\Delta x}{t_1}$ $V_2 = \frac{\Delta x}{t_2}$

$t_1 = \frac{\Delta x}{V_1}$ $t_2 = \frac{\Delta x}{V_2}$

$-t_2 = \frac{\Delta x}{V_2}$

$t_1 - t_2 = \frac{\Delta x}{V_1} - \frac{\Delta x}{V_2}$

$330\ s$ $.90\ m/s$ $1.9\ m/s$

$t_1 - t_2 = \Delta x \left(\frac{1}{V_1} - \frac{1}{V_2}\right)$

$\Delta x = \frac{t_1 - t_2}{\frac{1}{V_1} - \frac{1}{V_2}}$

$= \frac{330\ s}{\frac{1}{.90\ m/s} - \frac{1}{1.9\ m/s}}$

$= 564\ m$

4c)

$\Delta x = 780\ m$

$V_1 = 0.9\ m/s$

$V_2 = 1.9\ m/s$

$V = \frac{\Delta x}{\Delta t}$

$\Delta t = \frac{\Delta x}{V}$

$t_1 = 867\ s$

$t_2 = 411\ s$

V_i	a	Motion of Object
+	+	speeding up (pos.)
−	−	speeding up (neg.)
+	−	slow down (pos.)
−	+	slow down (neg.)
+ or −	∅	const. velocity
∅	+ or −	speeding up from rest
∅	∅	stopped

Kinematics Equations:

Δx

v_i

v_f

Δt

a

$$\Delta x = v_i \Delta t + \frac{1}{2} a (\Delta t)^2$$

$$v_f = v_i + a \Delta t$$

$$v_f^2 = v_i^2 + 2a(\Delta x)$$

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3b) $a = +5\ m/s^2$

$v_i = 0\ m/s$

$v_f = 12.5\ m/s$

$t = 2.5\ s$

$\Delta x =$

$\Delta x = v_i t + \frac{1}{2} a t^2$

$= (0\ m/s)(2.5\ s) + \frac{1}{2}(5\ m/s^2)(2.5\ s)^2$

$= 15.6\ m$

HW: p. 70: 21, 25

p. 71: 34